

CLAIMS

What is claimed is:

1. An apparatus to collect a used toner on a photoconductive drum in a laser printer, the apparatus comprising:

a used toner collecting bucket having a used toner entry port into which the used toner on the photoconductive drum flows;

a cleaning blade installed at the used toner entry port to guide the used toner to the used toner entry port by scraping the used toner off from the photoconductive drum; and

a used toner transferring unit to transfer the used toner so that the used toner accumulated at the used toner entry port is evenly distributed within the used toner collecting bucket.

2. The apparatus according to claim 1, wherein the used toner transferring unit comprises:

an eccentric axle to perform an eccentric motion with respect to a driving axle installed, in a rotatable manner, within the used toner collecting bucket; and

a paddle member cooperating with the eccentric axle to move the used toner at the used toner entry port, step by step, into the used toner collecting bucket while reciprocating along a predetermined trajectory.

3. The apparatus according to claim 2, wherein the paddle member comprises:

an axle supporting part having a cam groove in which a crankshaft is placed in a rotatable manner;

a paddle front end to scrape a toner located at the used toner entry port down to a bottom of the used toner collecting bucket while repeating a predetermined trajectory motion,

cooperating with a motion of the axle supporting part due to the crankshaft; and

a paddle rear end connected to an opposite side of the paddle front end with respect to the axle supporting part to scrape the used toner moved to the bottom of the used toner collecting bucket by the paddle front end into the used toner collecting bucket while repeating the predetermined trajectory motion.

4. The apparatus according to claim 3, wherein the paddle front end extends by a predetermined length in a predetermined direction from the axle supporting part so that the paddle front end is spaced from the bottom of the used toner collecting bucket, and has in a front end thereof a curve-shaped hook portion to scrape off the used toner accumulated at the used toner entry port.

5. The apparatus according to claim 3, wherein the paddle rear end is formed of a plate shape to gradually push out the used toner on the bottom of the used toner collecting bucket into the used toner collecting bucket while sliding across the bottom thereof while being in contact with the bottom of the used toner collecting bucket for an interval during its trajectory motion.

6. The apparatus according to claim 4, wherein the paddle rear end is formed of a plate shape to gradually push out the used toner on the bottom of the collecting bucket while sliding across the bottom thereof while in contact with the bottom of the used toner collecting bucket for an interval during its trajectory motion.

7. The apparatus according to claim 4, wherein a plurality of slots are formed, at a predetermined interval on the paddle rear end so that the used toner on the bottom of the used toner collecting bucket is moved along at step intervals.

8. The apparatus according to claim 7, wherein the plurality of slots are formed at a predetermined length and in a direction perpendicular to a direction of the trajectory motion of the paddle rear end.

9. The apparatus according to claim 2, wherein a movement trajectory of the paddle member comprises:

a transferring trajectory movement that moves the used toner located at the used toner entry port into the used toner collecting bucket while moving from the used toner entry port to an inner direction of the used toner collecting bucket; and

a returning trajectory movement that returns to a direction toward the used toner entry port from the inside of the used toner collecting bucket after the transferring trajectory movement.

10. The apparatus according to claim 9, wherein the transferring trajectory movement of the paddle member is performed while the eccentric axle passes by a lowest point with respect to the driving axle, and the returning trajectory movement is performed while the eccentric axle passes by a highest point with respect to the driving axle.

11. The apparatus according to claim 9, wherein the transferring trajectory movement comprises a straight line so that the paddle member slides across the bottom inner side of the used toner collecting bucket.

12. The apparatus according to claim 10, wherein the transferring trajectory movement comprises a straight line so that the paddle member slides across the bottom inner side of the used toner collecting bucket.

13. The apparatus according to claim 10, wherein the returning trajectory movement forms a circular arc of a predetermined shape so that a movement is made with part of the paddle member spaced apart from the bottom of the used toner collecting bucket.

14. The apparatus according to claim 3, wherein the axle supporting part is installed between the paddle front end and the paddle rear end.

15. The apparatus according to claim 3, wherein the cam groove of the axle supporting part is formed vertically at a predetermined length and is closed in an upper direction and opened in a lower direction, and the eccentric axle raises up the axle supporting part when passing by a highest point and moves the axle supporting part horizontally when passing by a lowest point.

16. The apparatus according to claim 3, wherein the paddle member is installed so that its center of mass is biased to a side of the paddle rear end with respect to the eccentric axle.

17. The apparatus according to claim 2, wherein the used toner entry port is positioned on an upper part of the used toner collecting bucket at a predetermined height from the bottom, and the paddle member comprises:

an axle supporting part having a cam groove in which the eccentric axle is connected in a rotatable manner, and reciprocating along a predetermined trajectory by the eccentric axle;

a paddle front end extending away from one side of the axle supporting part to drop the used toner located at the used toner entry port down to the bottom inner side of the used toner collecting bucket;

a sheet-type paddle installed between the paddle front end and the axle supporting part to move, along a predetermined distance, the used toner dropped down to the bottom inner side of the used toner collecting bucket; and

a paddle rear end extending from another side of the axle supporting part, to transfer the used toner, delivered by the sheet-type paddle, step by step along the inside of the used toner collecting bucket.

18. The apparatus according to claim 14, wherein the paddle member further comprises:

a sheet-type paddle part to move the toner transferred into the toner collecting bucket by the paddle front end into a trajectory range of the paddle rear end.

19. A toner removing apparatus to remove toner from a toner image transferring member, the toner removing apparatus comprising:

a toner collecting container having a toner entry port therein to collect the toner from the toner image transferring member;

a cleaning member positioned at the toner entry port to guide the toner from the toner image transferring member through the toner entry port; and

a used toner transferring member to transfer the guided toner away from the toner entry port and along a bottom of the toner collecting container to evenly distribute the toner therein.

20. The toner removing apparatus according to claim 19, wherein the toner collecting container further comprises:

an eccentric cam to engage with and move the toner transferring member eccentrically within the toner collecting container such that the toner is guided away from the toner entry port and along the bottom of the toner collecting container at the same time.

21. The toner removing apparatus according to claim 20, wherein the used toner transferring member comprises:

a front end to scrape the guided toner away from the toner entry port and into the toner collecting container;

a rear end to evenly distribute the scraped toner along a bottom of the toner collecting container; and

a sheet type paddle member extending from the toner image transferring member to move the scraped toner toward the rear end of the toner image transferring member.

22. The toner removing apparatus according to claim 21, wherein the rear end of the toner transferring member is formed of a plate shape to gradually distribute the used toner on the bottom of the toner collecting container while sliding across the bottom thereof.

23. The toner removing apparatus according to claim 22, wherein the rear end of the toner image transferring member has a plurality of slots formed therein to engage with and distribute the toner within the toner collecting container.